# QUALITY INDICATORS[™] SOFTWARE Results of Comparison Testing Between SAS v6.0 ICD-9-CM and WinQI v6.0 ICD-9-CM Software

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The Agency for Healthcare Research and Quality (AHRQ) Quality Indicators[TM] (QI) were developed specifically to meet the short-term needs for information on healthcare quality using standardized, user-friendly methods and existing sources of data. The AHRQ QI program is unique in that it provides free, publicly-available software tools that calculate the AHRQ QI rates. The software allows users to calculate QI rates based on their own administrative data using a standard desktop computer. Each version of the QIs is released with software in two different platforms: a SAS[®][†] application and a Windows application. The SAS software was first released in the late 1990s. It consists of several modules of SAS code and requires a SAS license to run. The Windows-based software, known as WinQI, was first released in 2005. It was created in order to provide an easy-to-use, low-cost option for calculating the QIs that was not dependent on licensed software. Developed on Microsoft[®] Visual Studio using C# and .NET, AHRQ WinQI runs on Windows operating systems and requires only freely available software components: AHRQ-produced software, Microsoft .NET (for runtime environment and core software libraries), and Microsoft SQL Server Express (for data storage and manipulation). Table 1 lists the differences between SAS QI v6.0 ICD-9-CM and WinQI v6.0 ICD-9-CM Both the SAS and WinQI software are available in Version 6.0 as either 32-bit or 64-bit applications. The 32-bit applications are targeted for Windows XP operating systems, and the 64-bit applications are targeted for Windows 7 and 8 operating systems.

**Table 1. Differences between SAS QI v6.0 and WinQI v6.0**

| SAS QI v6.0 | WinQI v6.0 |
|---|---|
| Requires licensed SAS software | Requires free downloadable software |
| User can modify the software | User is unable to modify the software |
| Data load and error checking at the discretion of the user | Includes data load and error checking functions |
| User must run a set of programs for each module, and all indicators in a module are displayed in output | All four QI modules calculated in a single program, and user can select which indicators to output |
| Area-level indicator denominators are adjusted based on the combination of county, age, gender and race in the numerator (adjustments are generally small (<.01%) in absolute terms) | Area-level indicators denominators are not adjusted |
|  | Suppresses expected rate, risk-adjusted rate, and smoothed rate of PDI #6 RACHS-1 Pediatric Heart Surgery Mortality Rate |
| Condition-specific denominators can be used in place of overall population denominators for diabetes-related PQIs using data from the CDC National Diabetes Surveillance System | Condition-specific denominators are not available for any of the PQIs |
| Observations with FIPS codes not present in the population file are excluded from Area level metrics. | Observations with FIPS codes not present in the population file are included in Area level measures with no FIPS assigned. |

Both versions of the QI software are updated on an annual basis to reflect changes in the AHRQ QI technical specifications. New software versions and updated technical specifications are released simultaneously. Routine annual updates include yearly International Classification of Diseases, 9th revision, Clinical Modification (ICD-9-CM), Medicare Severity-Diagnostic

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[†] SAS[®] is a statistical software package distributed by the SAS Institute, Inc. SAS and all other SAS Institute Inc. product or service names are registered trademarks or trademarks of SAS Institute Inc., Cary, NC, USA. The company may be contacted directly regarding the licensing of their products. The SAS Institute, Inc. has no affiliation with AHRQ nor involvement in the development of the AHRQ QI. For more information, visit the SAS Institute website at http://www.sas.com.

Related Groups (MS-DRG), Major Diagnostic Categories (MDC), updated version of the 3M[TM] APR-DRG grouper[1], new Census population files, and newly derived risk adjustment parameters.

The AHRQ QI software goes through rigorous testing prior to release, including the following:
- Comparison of rates produced through AHRQ QI SAS and AHRQ WinQI, aggregated and detailed provider/county-level
- User testing on the installation.

AHRQ QI v6.0 software included applications that are compatible with 32-bit and 64-bit environments, and thus additional testing comparing rates across these environments was performed.

This document summarizes the testing results for AHRQ QI v6.0 ICD-9-CM software for WinQI (released in October 2016) and SAS (released in July 2016). Testing was performed using AHRQ Healthcare Cost and Utilization Project (HCUP) data: 3,571,315 discharges in the Florida 2013 and Maryland and Nevada 2012 HCUP State Inpatient Databases (SID).  To ensure comparability of Area rates, the year of all observations was set to 2014 and observations with a FIPS code not in the 2014 population file were removed.

The table in this document compares the calculated rates using AHRQ QI SAS to AHRQ WinQI in a 64-bit environment. There should be zero to little variation in the rates (as evidenced by a SAS/WinQI rate ratio=1), with two exceptions. Small differences may occur due to rounding of the estimates and slight variation in the number of providers in area-level indicators due to area denominator adjustments. The table confirms that the results produced with AHRQ QI SAS are consistent with the results produced with AHRQ WinQI. More detailed tables showing aggregated estimates for SAS and WinQI (Appendix A) and comparisons at the provider or county level (Appendix B) are provided in the appendices.

**Known considerations for v6.0 ICD-9-CM software:**

- In Version 6.0 and previous versions, the SAS QI and WinQI software calculates area denominators differently for 2 indicators (PQI 05, PQI 15).  The difference is attributed to the way SAS QI and WinQI's calculate denominators in area-level indicators seen in the comparison test results.  In those cases, the denominator differences then lead to differences in the rates. For the area-level indicators mentioned above, the denominators are related to county populations, which are derived from official U.S. Census Bureau data.  However, for the counties that are not included in the population file are treated and aggregated differently between the SAS QI and WinQI software.

- For specific indicators (PSI 07 and PSI 08), the small variances in the risk-adjusted rates are known issues and will be corrected in the future releases.

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‡ HCUP Databases. Healthcare Cost and Utilization Project (HCUP). 2012 and 2013. Agency for Healthcare Research and Quality, Rockville, MD. www.hcup-us.ahrq.gov/databases.jsp. Additionally, the AHRQ QI Program would like to acknowledge the following HCUP Partners who allowed their SID data to be used for testing purposes in the development of the AHRQ QI software: **Florida** Agency for Health Care Administration, **Maryland** Health Services Cost Review Commission, and **Nevada** Department of Health and Human Services

[1] APR-DRG codes are used in risk adjustment calculation for IQI modules only. WinQI v6.0 ICD-9-CM doesn't yet incorporate the updated APR-DRG grouper as the IQI module is not included in this release. APR-DRG grouper software will be included in the future version of v6.0 ICD-9-CM that incorporates IQI module.

## Table 2. Comparison of Rates from AHRQ QI SAS v6.0 Software to AHRQ WinQI v6.0

| QI | Type | Ratio of SAS statistic over WinQI statistic | | | | | |
|---|---|---|---|---|---|---|---|
| | | OBS num | OBS den | OBS rate | EXP rate | ADJ rate | Smoothed rate |
| Prevention Quality Indicators (PQIs) | | | | | | | |
| PQI #1 Diabetes Short-Term Complications Admission Rate | AREA | 1 | 1 | 1 | 1 | 1 | 1 |
| PQI #2 Perforated Appendix Admission Rate | AREA | 1 | 1 | 1 | 1 | 1 | 1 |
| PQI #3 Diabetes Long-Term Complications Admission Rate | AREA | 1 | 1 | 1 | 1 | 1 | 1 |
| PQI #5 Chronic Obstructive Pulmonary Disease (COPD) or Asthma in Older Adults Admission Rate | AREA | 1 | 1.00485 | 0.9952 | 1.00025 | 0.9948 | 0.99496 |
| PQI #7 Hypertension Admission Rate | AREA | 1 | 1 | 1 | 1 | 1 | 1 |
| PQI #8 Heart Failure Admission Rate | AREA | 1 | 1 | 1 | 1 | 1 | 1 |
| PQ #10 Dehydration Admission Rate | AREA | | | | | | |
| PQI #11 Bacterial Pneumonia Admission Rate | AREA | 1 | 1 | 1 | 1 | 1 | 1 |
| PQI #12 Urinary Tract Infection Admission Rate | AREA | 1 | 1 | 1 | 1 | 1 | 1 |
| PQI #14 Uncontrolled Diabetes Admission Rate | AREA | 1 | 1 | 1 | 1 | 1 | 1 |
| PQI #15 Asthma in Younger Adults Admission Rate | AREA | 1 | 1.08427 | 0.92168 | 0.99398 | 0.92818 | 0.92818 |
| PQI #16 Lower-Extremity Amputation among Patients with Diabetes Rate | AREA | 1 | 1 | 1 | 1 | 1 | 1 |
| PQI #90 Prevention Quality Overall Composite | AREA | 1 | 1 | 1 | 1 | 1 | 1 |
| PQI #91 Prevention Quality Acute Composite | AREA | 1 | 1 | 1 | 1 | 1 | 1 |
| PQI #92 Prevention Quality Chronic Composite | AREA | 1 | 1 | 1 | 1 | 1 | 1 |
| PQI #93 Prevention Quality Diabetes Composite (Numerator) | AREA | 1 | 1 | 1 | 1 | 1 | 1 |
| Patient Safety Indicators(PSIs) | | | | | | | |
| PSI #2 Death Rate in Low-Mortality Diagnosis Related Groups (DRGs) | PROVIDER | 1 | 1 | 1 | 1 | 1 | 1 |
| PSI #3 Pressure Ulcer Rate | PROVIDER | 1 | 1 | 1 | 1 | 1 | 1 |
| PSI #4 Death Rate among Surgical Inpatients with Serious Treatable Complications | PROVIDER | 1 | 1 | 1 | 1 | 1 | 1 |
| PSI #4A Stratum A | PROVIDER | 1 | 1 | 1 | 1 | 1 | 1 |
| PSI #4B Stratum B | PROVIDER | 1 | 1 | 1 | 1 | 1 | 1 |
| PSI #4C Stratum C | PROVIDER | 1 | 1 | 1 | 1 | 1 | 1 |
| PSI #4D Stratum D | PROVIDER | 1 | 1 | 1 | 1 | 1 | 1 |
| PSI #4E Stratum E | PROVIDER | 1 | 1 | 1 | 1 | 1 | 1 |
| PSI #5 Retained Surgical Item or Unretrieved Device Fragment Count | PROVIDER | 1 | | | | | |
| PSI #6 Iatrogenic Pneumothorax Rate | PROVIDER | 1 | 1 | 1 | 1 | 1 | 1 |
| PSI #7 Central Venous Catheter-Related Blood Stream Infection Rate | PROVIDER | 1 | 1 | 1 | 1.01253 | 0.98788 | 0.98786 |
| PSI #8 Postoperative Hip Fracture Rate | PROVIDER | 1 | 1 | 1 | 0.99527 | 1.00376 | 1.00376 |
| PSI #9 Perioperative Hemorrhage or Hematoma Rate | PROVIDER | 1 | 1 | 1 | 1 | 1 | 1 |
| PSI #10 Postoperative Physiologic and Metabolic Derangement Rate | PROVIDER | 1 | 1 | 1 | 1 | 1 | 1 |
| PSI #11 Postoperative Respiratory Failure Rate | PROVIDER | 1 | 1 | 1 | 1 | 1 | 1 |
| | | Ratio of SAS statistic over WinQI statistic | | | | | |

| QI | Type | OBS num | OBS den | OBS rate | EXP rate | ADJ rate | Smoothed rate |
|---|---|---|---|---|---|---|---|
| PSI #12 Perioperative Pulmonary Embolism or Deep Vein Thrombosis Rate | PROVIDER | 1 | 1 | 1 | 1 | 1 | 1 |
| PSI #13 Postoperative Sepsis Rate | PROVIDER | 1 | 1 | 1 | 1 | 1 | 1 |
| PSI #14 Postoperative Wound Dehiscence Rate | PROVIDER | 1 | 1 | 1 | 1 | 1 | 1 |
| PSI #15 Accidental Puncture or Laceration Rate | PROVIDER | 1 | 1 | 1 | 1 | 1 | 1 |
| PSI #16 Transfusion Reaction Count | PROVIDER | 1 | | | | | |
| PSI #18 Obstetric Trauma Rate – Vaginal Delivery With Instrument | PROVIDER | 1 | 1 | 1 | | | |
| PSI #19 Obstetric Trauma Rate – Vaginal Delivery Without Instrument | PROVIDER | 1 | 1 | 1 | | | |
| PSI #21 Retained Surgical Item or Unretrieved Device Fragment Rate | AREA | 1 | 1 | 1 | | | |
| PSI #22 Iatrogenic Pneumothorax Rate | AREA | 1 | 1 | 1 | | | |
| PSI #23 Central Venous Catheter-Related Blood Stream Infection Rate | AREA | 1 | 1 | 1 | | | |
| PSI #24 Postoperative Wound Dehiscence Rate | AREA | 1 | 1 | 1 | | | |
| PSI #25 Accidental Puncture or Laceration Rate | AREA | 1 | 1 | 1 | | | |
| PSI #26 Transfusion Reaction Rate | AREA | 1 | 1 | 1 | | | |
| PSI #27 Perioperative Hemorrhage or Hematoma Rate | AREA | 1 | 1 | 1 | | | |

SOURCE: Agency for Healthcare Research and Quality, Healthcare Cost and Utilization Project. 2010 Nationwide Inpatient Sample (unweighted) and AHRQ Quality Indicator SAS and WinQI Version 6.0 ICD-9-CM Software.

NOTE: Blank cell = N/A.

**Appendix Table A.1 Key to Appendix Table A**

| Column Heading | Description |
| --- | --- |
| OBS num | Number of discharges in the numerator |
| OBS den | Number of discharges in the denominator |
| OBS rate | Observed rate |
| EXP rate | Expected rate |
| ADJ rate | Risk adjusted rate |
| Smoothed rate | Smoothed rate |

**Appendix Table A.2 AHRQ QI SAS Version 6.0 Aggregate Estimates**

| QI | Type | SAS Version 6.0 | | | | | |
| --- | --- | --- | --- | --- | --- | --- | --- |
| | | OBS num | OBS den | OBS rate | EXP rate | ADJ rate | Smoothed rate |
| Prevention Quality Indicators (PQIs) | | | | | | | |
| PQI #1 Diabetes Short-Term Complications Admission Rate | AREA | 15575 | 239799857 | 0.0000649 | 0.0006829 | 0.0000656 | 0.0000656 |
| PQI #2 Perforated Appendix Admission Rate | AREA | 5655 | 18311 | 0.3088308 | 0.355265 | 0.3054352 | 0.3055112 |
| PQI #3 Diabetes Long-Term Complications Admission Rate | AREA | 29110 | 239799858 | 0.0001214 | 0.0010337 | 0.0001193 | 0.0001193 |
| PQI #5 Chronic Obstructive Pulmonary Disease (COPD) or Asthma in Older Adults Admission Rate | AREA | 93395 | 150002200 | 0.0006226 | 0.0048902 | 0.0006123 | 0.0006124 |
| PQI #7 Hypertension Admission Rate | AREA | 18297 | 239799858 | 0.0000763 | 0.0004992 | 0.0000752 | 0.0000752 |
| PQI #8 Heart Failure Admission Rate | AREA | 86516 | 239799884 | 0.0003608 | 0.003303 | 0.0003512 | 0.0003513 |
| PQ #10 Dehydration Admission Rate | AREA | 34475 | 239799870 | 0.0001438 | 0.0013313 | 0.0001405 | 0.0001405 |
| PQI #11 Bacterial Pneumonia Admission Rate | AREA | 60249 | 239799871 | 0.0002512 | 0.0025563 | 0.0002454 | 0.0002454 |
| PQI #12 Urinary Tract Infection Admission Rate | AREA | 48116 | 239799872 | 0.0002007 | 0.0015843 | 0.000197 | 0.000197 |
| PQI #14 Uncontrolled Diabetes Admission Rate | AREA | 5164 | 239799857 | 0.0000215 | 0.000133 | 0.0000213 | 0.0000213 |
| PQI #15 Asthma in Younger Adults Admission Rate | AREA | 4543 | 89797674 | 0.0000506 | 0.0004131 | 0.0000504 | 0.0000504 |

**Appendix Table A.2 AHRQ QI SAS Version 6.0 Aggregate Estimates**

| QI | Type | SAS Version 5.0 | | | | | |
|---|---|---|---|---|---|---|---|
| | | OBS num | OBS den | OBS rate | EXP rate | ADJ rate | Smoothed rate |
| PQI #16 Lower-Extremity Amputation among Patients with Diabetes Rate | AREA | 3957 | 239799857 | 0.0000165 | 0.0001759 | 0.0000161 | 0.0000161 |
| PQI #90 Prevention Quality Overall Composite | AREA | 397678 | 239800040 | 0.0016584 | 0.014434 | 0.0016222 | 0.0016222 |
| PQI #91 Prevention Quality Acute Composite | AREA | 142840 | 239799920 | 0.0005957 | 0.0054724 | 0.0005826 | 0.0005827 |
| PQI #92 Prevention Quality Chronic Composite | AREA | 254846 | 239799922 | 0.0010627 | 0.008962 | 0.0010399 | 0.00104 |
| PQI#93 Prevention Diabetes Composite | AREA | 52112 | 239799858 | 0.0002173 | 0.0019472 | 0.0002156 | 0.0002156 |
| Patient Safety Indicators(PSIs) | | | | | | | |
| PSI #2 Death Rate in Low-Mortality Diagnosis Related Groups (DRGs) | PROVIDER | 240 | 700755 | 0.0003425 | 0.0005006 | 0.0002362 | 0.0002364 |
| PSI #3 Pressure Ulcer Rate | PROVIDER | 489 | 1507740 | 0.0003243 | 0.0002571 | 0.0003426 | 0.0003425 |
| PSI #4 Death Rate among Surgical Inpatients with Serious Treatable Complications | PROVIDER | 2779 | 23152 | 0.1200328 | 0.1186637 | 0.1176946 | 0.1176876 |
| PSI #4A Stratum A | PROVIDER | 150 | 2791 | 0.0537442 | 0.0509208 | 0.0499866 | 0.0497625 |
| PSI #4B Stratum B | PROVIDER | 655 | 10408 | 0.0629324 | 0.0680728 | 0.0632997 | 0.0633807 |
| PSI #4C Stratum C | PROVIDER | 681 | 3655 | 0.1863201 | 0.1856522 | 0.1792795 | 0.1792703 |
| PSI #4D Stratum D | PROVIDER | 1136 | 3060 | 0.3712418 | 0.3501949 | 0.3624877 | 0.3622639 |
| PSI #4E Stratum E | PROVIDER | 157 | 3238 | 0.0484867 | 0.0452515 | 0.0463798 | 0.0461817 |
| PSI #5 Retained Surgical Item or Unretrieved Device Fragment Count | PROVIDER | 92 | 92 | 1 | | | |
| PSI #6 Iatrogenic Pneumothorax Rate | PROVIDER | 819 | 2591093 | 0.0003161 | 0.0003097 | 0.0003226 | 0.0003226 |
| PSI #7 Central Venous Catheter-Related Blood Stream Infection Rate | PROVIDER | 609 | 2001182 | 0.0003043 | 0.0001535 | 0.0003016 | 0.000301 |
| PSI #8 Postoperative Hip Fracture Rate | PROVIDER | 174 | 1968397 | 0.0000884 | 0.0000841 | 0.0000801 | 0.0000801 |
| PSI #9 Perioperative Hemorrhage or Hematoma Rate | PROVIDER | 2750 | 638201 | 0.004309 | 0.0043296 | 0.0043509 | 0.004351 |
| PSI #10 Postoperative Physiologic and Metabolic Derangement Rate | PROVIDER | 259 | 261100 | 0.000992 | 0.0007187 | 0.0009156 | 0.0009137 |
| PSI #11 Postoperative Respiratory Failure Rate | PROVIDER | 2508 | 221990 | 0.0112978 | 0.0098125 | 0.0107156 | 0.0107138 |
| PSI #12 Perioperative Pulmonary Embolism or Deep Vein Thrombosis Rate | PROVIDER | 2771 | 679381 | 0.0040787 | 0.0036988 | 0.0040868 | 0.0040861 |
| PSI #13 Postoperative Sepsis Rate | PROVIDER | 1227 | 251835 | 0.0048722 | 0.0044152 | 0.0046189 | 0.0046173 |
| PSI #14 Postoperative Wound Dehiscence Rate | PROVIDER | 199 | 97439 | 0.0020423 | 0.0017999 | 0.0019375 | 0.0019341 |
| PSI #15 Accidental Puncture or Laceration Rate | PROVIDER | 90 | 119571 | 0.0007527 | 0.0007356 | 0.0007303 | 0.0007301 |
| PSI #16 Transfusion Reaction Count | PROVIDER | 8 | 8 | 1 | | | |

**Appendix Table A.2 AHRQ QI SAS Version 6.0 Aggregate Estimates**

| QI | Type | SAS Version 5.0 | | | | | |
| --- | --- | --- | --- | --- | --- | --- | --- |
| | | OBS num | OBS den | OBS rate | EXP rate | ADJ rate | Smoothed rate |
| PSI #18 Obstetric Trauma Rate – Vaginal Delivery With Instrument | PROVIDER | 1247 | 11151 | 0.1118285 | | | |
| PSI #19 Obstetric Trauma Rate – Vaginal Delivery Without Instrument | PROVIDER | 3457 | 175475 | 0.0197008 | | | |
| PSI #21 Retained Surgical Item or Unretrieved Device Fragment Rate | AREA | 233 | 239799857 | 0.000001 | | | |
| PSI #22 Iatrogenic Pneumothorax Rate | AREA | 1532 | 239799858 | 0.0000064 | | | |
| PSI #23 Central Venous Catheter-Related Blood Stream Infection Rate | AREA | 2054 | 239799858 | 0.0000086 | | | |
| PSI #24 Postoperative Wound Dehiscence Rate | AREA | 385 | 239799857 | 0.0000016 | | | |
| PSI #25 Accidental Puncture or Laceration Rate | AREA | 96 | 239799857 | 0.0000004 | | | |
| PSI #26 Transfusion Reaction Rate | AREA | 20 | 239799857 | 0.0000001 | | | |
| PSI #27 Perioperative Hemorrhage or Hematoma Rate | AREA | 6831 | 239799857 | 0.0000285 | | | |

SOURCE: Agency for Healthcare Research and Quality, AHRQ Healthcare Cost and Utilization Project (HCUP) data: 3,571,315 discharges in the Florida 2013 and Maryland and Nevada 2012 HCUP State Inpatient Databases (SID) (unweighted) and AHRQ Quality Indicator SAS and WinQI Version 6.0 ICD-9-CM Software.

NOTE: Rates are reported as output from the software and not multiplied by any factor; Blank cell = N/A.

## Appendix A.3 AHRQ WinQI Version 6.0 Aggregate Estimates

| QI | Type | WinQI Version 5.0 | | | | | |
|---|---|---|---|---|---|---|---|
| | | OBS num | OBS den | OBS rate | EXP rate | ADJ rate | Smoothed rate |
| **Prevention Quality Indicators (PQIs)** | | | | | | | |
| PQI #1 Diabetes Short-Term Complications Admission Rate | AREA | 15575 | 239799857 | 0.0000649 | 0.0006829 | 0.0000656 | 0.0000656 |
| PQI #2 Perforated Appendix Admission Rate | AREA | 5655 | 18311 | 0.3088308 | 0.355265 | 0.3054352 | 0.3055112 |
| PQI #3 Diabetes Long-Term Complications Admission Rate | AREA | 29110 | 239799858 | 0.0001214 | 0.0010337 | 0.0001193 | 0.0001193 |
| PQI #5 Chronic Obstructive Pulmonary Disease (COPD) or Asthma in Older Adults Admission Rate | AREA | 93395 | 149277952 | 0.0006256 | 0.004889 | 0.0006155 | 0.0006155 |
| PQI #7 Hypertension Admission Rate | AREA | 18297 | 239799858 | 0.0000763 | 0.0004992 | 0.0000752 | 0.0000752 |
| PQI #8 Heart Failure Admission Rate | AREA | 86516 | 239799874 | 0.0003608 | 0.003303 | 0.0003512 | 0.0003513 |
| PQ #10 Dehydration Admission Rate | AREA | 34475 | 239799867 | 0.0001438 | 0.0013313 | 0.0001405 | 0.0001405 |
| PQI #11 Bacterial Pneumonia Admission Rate | AREA | 60249 | 239799865 | 0.0002512 | 0.0025563 | 0.0002454 | 0.0002454 |
| PQI #12 Urinary Tract Infection Admission Rate | AREA | 48116 | 239799866 | 0.0002007 | 0.0015843 | 0.000197 | 0.000197 |
| PQI #14 Uncontrolled Diabetes Admission Rate | AREA | 5164 | 239799857 | 0.0000215 | 0.000133 | 0.0000213 | 0.0000213 |
| PQI #15 Asthma in Younger Adults Admission Rate | AREA | 4543 | 82818490 | 0.0000549 | 0.0004156 | 0.0000543 | 0.0000543 |
| PQI #16 Lower-Extremity Amputation among Patients with Diabetes Rate | AREA | 3957 | 239799857 | 0.0000165 | 0.0001759 | 0.0000161 | 0.0000161 |
| PQI #90 Prevention Quality Overall Composite | AREA | 397678 | 239799986 | 0.0016584 | 0.014434 | 0.0016222 | 0.0016222 |
| PQI #91 Prevention Quality Acute Composite | AREA | 142840 | 239799903 | 0.0005957 | 0.0054724 | 0.0005826 | 0.0005827 |
| PQI #92 Prevention Quality Chronic Composite | AREA | 254846 | 239799900 | 0.0010627 | 0.008962 | 0.0010399 | 0.00104 |
| PQI #93 Prevention Quality Diabetes Composite | AREA | 52112 | 239799858 | 0.0002173 | 0.0019472 | 0.0002156 | 0.0002156 |
| **Patient Safety Indicators (PSIs)** | | | | | | | |
| PSI #2 Death Rate in Low-Mortality Diagnosis Related Groups (DRGs) | PROVIDER | 240 | 700755 | 0.0003425 | 0.0005006 | 0.0002362 | 0.0002364 |
| PSI #3 Pressure Ulcer Rate | PROVIDER | 489 | 1507739 | 0.0003243 | 0.0002571 | 0.0003426 | 0.0003425 |
| PSI #4 Death Rate among Surgical Inpatients with Serious Treatable Complications | PROVIDER | 2779 | 23152 | 0.1200328 | 0.1186637 | 0.1176946 | 0.1176876 |
| PSI #4A Stratum A | PROVIDER | 150 | 2791 | 0.0537442 | 0.0509208 | 0.0499866 | 0.0497625 |
| PSI #4B Stratum B | PROVIDER | 655 | 10408 | 0.0629324 | 0.0680728 | 0.0632997 | 0.0633807 |
| PSI #4C Stratum C | PROVIDER | 681 | 3655 | 0.1863201 | 0.1856522 | 0.1792795 | 0.1792703 |
| PSI #4D Stratum D | PROVIDER | 1136 | 3060 | 0.3712418 | 0.3501949 | 0.3624877 | 0.3622639 |

## Appendix A.3 AHRQ WinQI Version 6.0 Aggregate Estimates

| QI | Type | WinQI Version 5.0 | | | | | |
|---|---|---|---|---|---|---|---|
| | | OBS num | OBS den | OBS rate | EXP rate | ADJ rate | Smoothed rate |
| PSI #4E Stratum E | PROVIDER | 157 | 3238 | 0.0484867 | 0.0452515 | 0.0463798 | 0.0461817 |
| PSI #5 Retained Surgical Item or Unretrieved Device Fragment Count | PROVIDER | 92 | | | | | |
| PSI #6 Iatrogenic Pneumothorax Rate | PROVIDER | 819 | 2591093 | 0.0003161 | 0.0003097 | 0.0003226 | 0.0003226 |
| PSI #7 Central Venous Catheter-Related Blood Stream Infection Rate | PROVIDER | 609 | 2001182 | 0.0003043 | 0.0001516 | 0.0003053 | 0.0003047 |
| PSI #8 Postoperative Hip Fracture Rate | PROVIDER | 174 | 1968397 | 0.0000884 | 0.0000845 | 0.0000798 | 0.0000798 |
| PSI #9 Perioperative Hemorrhage or Hematoma Rate | PROVIDER | 2750 | 638201 | 0.004309 | 0.0043296 | 0.0043509 | 0.004351 |
| PSI #10 Postoperative Physiologic and Metabolic Derangement Rate | PROVIDER | 259 | 261100 | 0.000992 | 0.0007187 | 0.0009156 | 0.0009137 |
| PSI #11 Postoperative Respiratory Failure Rate | PROVIDER | 2508 | 221990 | 0.0112978 | 0.0098125 | 0.0107156 | 0.0107138 |
| PSI #12 Perioperative Pulmonary Embolism or Deep Vein Thrombosis Rate | PROVIDER | 2771 | 679381 | 0.0040787 | 0.0036988 | 0.0040868 | 0.0040861 |
| PSI #13 Postoperative Sepsis Rate | PROVIDER | 1227 | 251835 | 0.0048722 | 0.0044152 | 0.0046189 | 0.0046173 |
| PSI #14 Postoperative Wound Dehiscence Rate | PROVIDER | 199 | 97439 | 0.0020423 | 0.0017999 | 0.0019375 | 0.0019341 |
| PSI #15 Accidental Puncture or Laceration Rate | PROVIDER | 90 | 119571 | 0.0007527 | 0.0007356 | 0.0007303 | 0.0007301 |
| PSI #16 Transfusion Reaction Count | PROVIDER | 8 | | | | | |
| PSI #18 Obstetric Trauma Rate – Vaginal Delivery With Instrument | PROVIDER | 1247 | 11151 | 0.1118285 | | | |
| PSI #19 Obstetric Trauma Rate – Vaginal Delivery Without Instrument | PROVIDER | 3457 | 175475 | 0.0197008 | | | |
| PSI #21 Retained Surgical Item or Unretrieved Device Fragment Rate | AREA | 233 | 239799857 | 0.000001 | | | |
| PSI #22 Iatrogenic Pneumothorax Rate | AREA | 1532 | 239799857 | 0.0000064 | | | |
| PSI #23 Central Venous Catheter-Related Blood Stream Infection Rate | AREA | 2054 | 239799857 | 0.0000086 | | | |
| PSI #24 Postoperative Wound Dehiscence Rate | AREA | 385 | 239799857 | 0.0000016 | | | |
| PSI #25 Accidental Puncture or Laceration Rate | AREA | 96 | 239799857 | 0.0000004 | | | |
| PSI #26 Transfusion Reaction Rate | AREA | 20 | 239799857 | 0.0000001 | | | |
| PSI #27 Perioperative Hemorrhage or Hematoma Rate | AREA | 6831 | 239799857 | 0.0000285 | | | |

SOURCE: Agency for Healthcare Research and Quality, AHRQ Healthcare Cost and Utilization Project (HCUP) data: 3,571,315 discharges in the Florida 2013 and Maryland and Nevada 2012 HCUP State Inpatient Databases (SID) (unweighted) and AHRQ Quality Indicator SAS and WinQI Version 6.0 ICD-9-CM Software.

NOTE: Rates are reported as output from the software and not multiplied by any factor; Blank cell = N/A.

**Appendix Table B.1 Key to Appendix Table B**

| Column Heading | D |
|---|---|
| QI | Quality Indicator |
| TYPE | Provider-level or Area-level indicator |
| N_SAS | Number of providers (or counties) for which the QI calculation was reported by SAS |
| N_WINQI | Number of providers (or counties) for which the QI calculation was reported by WinQI |
| N_NUM | Number of providers (or counties) with a numerator difference between SAS and WinQI |
| MAX DIFF NUM | Maximum difference in the numerator for any one provider (or county) as calculated by SAS and WinQI |
| N_DEN | Number of providers (or counties) with a denominator difference between SAS and WinQI |
| MAX DIFF DEN | Maximum difference in the denominator for any one provider (or county) as calculated by SAS and WinQI |
| N_OBS | Number of providers (or counties) with a difference between SAS and WinQI in the observed rates |
| MAX DIFF OBS | Maximum difference in the observed rate for any one provider (or county) as calculated by SAS and WinQI |
| MAX %DIFF OBS | Maximum difference (expressed as a percentage of the SAS estimate) in the observed rate for any one provider (or county) as calculated by SAS and WinQI |
| N_EXP | Number of providers (or counties) with a difference between SAS and WinQI in the expected rates |
| MAX DIFF EXP | Maximum difference in the expected rate for any one provider (or county) as calculated by SAS and WinQ |
| MAX %DIFF EXP | Maximum difference (expressed as a percentage of the SAS estimate) in the expected rate for any one provider (or county) as calculated by SAS and WinQI |
| N_RAR | Number of providers (or counties) with a difference between SAS and WinQI in the risk-adjusted rat |
| MAX DIFF RAR | Maximum difference in the risk-adjusted rate for any one provider (or county) as calculated by SAS and WinQI |
| MAX %DIFF RAR | Maximum difference (expressed as a percentage of the SAS estimate) in the risk-adjusted rate for any one provider (or county) as calculated by SAS and WinQI |
| N_SR | Number of providers (or counties) with a difference between SAS and WinQI in the smoothed rates |
| MAX DIFF SR | Maximum difference in the smoothed rate for any one provider (or county) as calculated by SAS and WinQ |
| MAX %DIFF SR | Maximum difference (expressed as a percentage of the SAS estimate) in the smoothed rate for any one provider (or county) as calculated by SAS and WinQI |

**Appendix Table B.2 Comparison of SAS Version 6.0 to WinQI Version 6.0, Detailed Provider/County Level**

| QI | Type | Number of Providers or Counties | | Difference between SAS and WinQI | | | | | | | | | | | | | | | |
| | | | | Numerator | | Denominator | | Observed Rate (Ratio†) | | | Expected Rate (Variance†) | | | Risk Adjusted Rate (Standard Error†) | | | Smoothed Rate (Weight†) | | |
| | | N_SAS | N_WinQI | N_NUM | MAX DIFF NUM | N_DEN | MAX DIFF DEN | N_OBS | MAX DIFF OBS | MAX % DIFF OBS | N_EXP | MAX DIFF EXP | MAX % DIFF EXP | N_RAR | MAX DIFF RAR | MAX % DIFF RAR | N_SR | MAX DIFF SR | MAX % DIFF SR |
| Prevention Quality Indicators (PQIs) | | | | | | | | | | | | | | | | | | | |
| PQI #1 Diabetes Short-Term Complications Admission Rate | AREA | 2582 | 2582 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| PQI #2 Perforated Appendix Admission Rate | AREA | 502 | 502 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| PQI #3 Diabetes Long-Term Complications Admission Rate | AREA | 2582 | 2582 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| PQI #5 Chronic Obstructive Pulmonary Disease (COPD) or Asthma in Older Adults Admission Rate | AREA | 2582 | 2502 | 0 | 0 | 4 | 4 | 4 | 0.000001 | 0.01 | 4 | 0.000002 | 0.04 | 4 | 0.000002 | 0.05 | 4 | 0.000002 | 0.02 |
| PQI #7 Hypertension Admission Rate | AREA | 2582 | 2582 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| PQI #8 Heart Failure Admission Rate | AREA | 2582 | 2582 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| PQ #10 Dehydration Admission Rate | AREA | 2582 | 2582 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| PQI #11 Bacterial Pneumonia Admission Rate | AREA | 2582 | 2582 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| PQI #12 Urinary Tract Infection Admission Rate | AREA | 2582 | 2582 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

**Appendix Table B.2 Comparison of SAS Version 6.0 to WinQI Version 6.0, Detailed Provider/County Level**

| QI | Type | N_SAS | N_WinQI | N_NUM | MAX DIFF NUM | N_DEN | MAX DIFF DEN | N_OBS | MAX DIFF OBS | MAX % DIFF OBS | N_EXP | MAX DIFF EXP | MAX % DIFF EXP | N_RAR | MAX DIFF RAR | MAX % DIFF RAR | N_SR | MAX DIFF SR | MAX % DIFF SR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | Observed Rate (Ratio†) | | | Expected Rate (Variance†) | | | Risk Adjusted Rate (Standard Error†) | | | Smoothed Rate (Weight†) | | |
| PQI #14 Uncontrolled Diabetes Admission Rate | AREA | 2582 | 2582 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| PQI #15 Asthma in Younger Adults Admission Rate | AREA | 2582 | 1663 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| PQI #16 Lower-Extremity Amputation among Patients with Diabetes Rate | AREA | 2582 | 2582 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| PQI #90 Prevention Quality Overall Composite | AREA | 2582 | 2582 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| PQI #91 Prevention Quality Acute Composite | AREA | 2582 | 2582 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| PQI #92 Prevention Quality Chronic Composite | AREA | 2582 | 2582 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| PQI #93 Prevention Quality Diabetes composite | PROVIDER | 2582 | 2582 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| PSI #2 Death Rate in Low-Mortality Diagnosis Related Groups (DRGs) | PROVIDER | 376 | 376 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| PSI #3 Pressure Ulcer Rate | PROVIDER | 383 | 383 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| PSI #4 Death Rate among Surgical Inpatients with Serious Treatable Complications | PROVIDER | 305 | 305 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| PSI #4A Stratum A | PROVIDER | 260 | 260 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

# Appendix Table B.2 Comparison of SAS Version 6.0 to WinQI Version 6.0, Detailed Provider/County Level

| QI | Type | Number of Providers or Counties | | Numerator | | Denominator | | Observed Rate (Ratio†) | | | Expected Rate (Variance†) | | | Risk Adjusted Rate (Standard Error†) | | | Smoothed Rate (Weight†) | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | N_SAS | N_WinQI | N_NUM | MAX DIFF NUM | N_DEN | MAX DIFF DEN | N_OBS | MAX DIFF OBS | MAX % DIFF OBS | N_EXP | MAX DIFF EXP | MAX % DIFF EXP | N_RAR | MAX DIFF RAR | MAX % DIFF RAR | N_SR | MAX DIFF SR | MAX % DIFF SR |
| PSI #4B Stratum B | PROVIDER | 294 | 294 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| PSI #4C Stratum C | PROVIDER | 273 | 273 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| PSI #4D Stratum D | PROVIDER | 256 | 256 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| PSI #4E Stratum E | PROVIDER | 260 | 260 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| PSI #5 Retained Surgical Item or Unretrieved Device Fragment Count | PROVIDER | 62 | 62 | 0 | 0 | | | | | | | | | | | | | | |
| PSI #6 Iatrogenic Pneumothorax Rate | PROVIDER | 395 | 395 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| PSI #7 Central Venous Catheter-Related Blood Stream Infection Rate | PROVIDER | 394 | 394 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 296 | 0.00002 | 1.08 | 178 | 0.00053 | 2.27 | 190 | 0.000002 | 0.12 |
| PSI #8 Postoperative Hip Fracture Rate | PROVIDER | 394 | 394 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 71 | 0.000001 | 0.12 | 77 | 0.000046 | 0.62 | 36 | 0.000001 | 0.18 |
| PSI #9 Perioperative Hemorrhage or Hematoma Rate | PROVIDER | 331 | 331 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| PSI #10 Postoperative Physiologic and | PROVIDER | 273 | 273 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| PSI #11 Postoperative Respiratory Failure Rate | | 269 | 269 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

**Appendix Table B.2 Comparison of SAS Version 6.0 to WinQI Version 6.0, Detailed Provider/County Level**

| QI | Type | Number of Providers or Counties | | Difference between SAS and WinQI | | | | | | | | | | | | | | | | |
| | | | | Numerator | | Denominator | | Observed Rate (Ratio†) | | | Expected Rate (Variance†) | | | Risk Adjusted Rate (Standard Error†) | | | Smoothed Rate (Weight) | | |
| | | N_SAS | N_WinQI | N_NUM | MAX DIFF NUM | N_DEN | MAX DIFF DEN | N_OBS | MAX DIFF OBS | MAX % DIFF OBS | N_EXP | MAX DIFF EXP | MAX % DIFF EXP | N_RAR | MAX DIFF RAR | MAX % DIFF RAR | N_SR | MAX DIFF SR | MAX % DIFF SR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| PSI #12 Perioperative Pulmonary | PROVIDER | 331 | 331 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| PSI #13 Postoperative | PROVIDER | 271 | 271 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| PSI #14 Postoperative | PROVIDER | 291 | 291 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| PSI #15 Accidental Puncture or | PROVIDER | 301 | 301 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| PSI #16 Transfusion Reaction Count | PROVIDER | 4 | 4 | 0 | 0 | | | | | | | | | | | | | | |
| PSI #18 Obstetric Trauma Rate – Vaginal Delivery With Instrument | PROVIDER | 167 | 167 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | | | | | | | | |
| PSI #19 Obstetric Trauma Rate – Vaginal Delivery Without | PROVIDER | 175 | 175 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | | | | | | | | |
| PSI #21 Retained Surgical Item or Unretrieved Device Fragment Rate | PROVIDER | 2582 | 2582 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | | | | | | | | |
| PSI #22 Iatrogenic Pneumothorax Rate | PROVIDER | 2582 | 2582 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | | | | | | | | |
| PSI #23 Central Venous Catheter-Related Blood | PROVIDER | 2582 | 2582 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | | | | | | | | |
| PSI #24 Postoperative Wound Dehiscence Rate | PROVIDER | 2582 | 2582 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | | | | | | | | |

**Appendix Table B.2 Comparison of SAS Version 6.0 to WinQI Version 6.0, Detailed Provider/County Level**

| QI | Type | Number of Providers or Counties | | Difference between SAS and WinQI | | | | | | | | | | | | | | | | | |
| | | | | Numerator | | Denominator | | Observed Rate (Ratio†) | | | Expected Rate (Variance†) | | | Risk Adjusted Rate (Standard Error†) | | | Smoothed Rate (Weight†) | | |
| | | N_SAS | N_WinQI | N_NUM | MAX DIFF NUM | N_DEN | MAX DIFF DEN | N_OBS | MAX DIFF OBS | MAX % DIFF OBS | N_EXP | MAX DIFF EXP | MAX % DIFF EXP | N_RAR | MAX DIFF RAR | MAX % DIFF RAR | N_SR | MAX DIFF SR | MAX % DIFF SR |
| PSI #25 Accidental Puncture or Laceration Rate | PROVIDER | 2582 | 2582 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | | | | | | | | |
| PSI #26 Transfusion Reaction Rate | PROVIDER | 2582 | 2582 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | | | | | | | | |
| PSI #27 Perioperative Hemorrhage or Hematoma Rate | PROVIDER | 2582 | 2582 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | | | | | | | | |

SOURCE: Agency for Healthcare Research and Quality, AHRQ Healthcare Cost and Utilization Project (HCUP) data: 3,571,315 discharges in the Florida 2013 and Maryland and Nevada 2012 HCUP State Inpatient Databases (SID) (unweighted) and AHRQ Quality Indicator
SAS and WinQI ICD-9-CM Version 6.0 Software.

NOTE: Only observed and adjusted ratios are reported for area-level indicators and composites; Smoothed rates are not calculated for stratified indicators

| QI | Type | SAS Version 6.0 | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | Nbr of Provider or Counties | Range Num | Range Den | Range ObsRate (Ratio†) | Range ExpRate (Variance†) | Range RiskAdjRate (Standard Error†) | Range SmoothRate (Weight) |
| Prevention Quality Indicators (PQIs) | | | | | | | | |
| PQI #1 Diabetes Short-Term Complications Admission Rate | AREA | 2582 | 0-1095 | 1042-7496371 | 0-0.0015 | 0.0005-0.001 | 0-0.0015 | 0-0.0014 |
| PQI #2 Perforated Appendix Admission Rate | AREA | 502 | 0-473 | 1-2018 | 0-1 | 0.2014-0.5459 | 0-1 | 0.2091-0.4772 |
| PQI #3 Diabetes Long-Term Complications Admission Rate | AREA | 2582 | 0-3074 | 1042-7496371 | 0-0.003 | 0.0002-0.0016 | 0-0.003 | 0-0.003 |
| PQI #5 Chronic Obstructive Pulmonary Disease (COPD) or Asthma in Older Adults Admission Rate | AREA | 2582 | 0-7815 | 352-4560813 | 0-0.0257 | 0.0031-0.0073 | 0-0.0238 | 0-0.0235 |
| PQI #7 Hypertension Admission Rate | AREA | 2582 | 0-2223 | 1042-7496371 | 0-0.0021 | 0.0001-0.0008 | 0-0.0024 | 0-0.0018 |
| PQI #8 Heart Failure Admission Rate | AREA | 2582 | 0-8666 | 1042-7496371 | 0-0.0082 | 0.0006-0.0072 | 0-0.0087 | 0-0.0087 |
| PQ #10 Dehydration Admission Rate | AREA | 2582 | 0-2510 | 1042-7496371 | 0-0.003 | 0.0004-0.0027 | 0-0.003 | 0-0.003 |
| PQI #11 Bacterial Pneumonia Admission Rate | AREA | 2582 | 0-5410 | 1042-7496371 | 0-0.0104 | 0.0006-0.0052 | 0-0.0103 | 0-0.0094 |
| PQI #12 Urinary Tract Infection Admission Rate | AREA | 2582 | 0-6236 | 1042-7496371 | 0-0.0053 | 0.0006-0.003 | 0-0.0051 | 0-0.0047 |
| PQI #14 Uncontrolled Diabetes Admission Rate | AREA | 2582 | 0-736 | 1042-7496371 | 0-0.0006 | 0.0001-0.0002 | 0-0.0006 | 0-0.0005 |
| PQI #15 Asthma in Younger Adults Admission Rate | AREA | 2582 | 0-370 | 379-2935558 | 0-0.0015 | 0.0003-0.0005 | 0-0.0016 | 0-0.0014 |
| PQI #16 Lower-Extremity Amputation among Patients with Diabetes Rate | AREA | 2582 | 0-424 | 1042-7496371 | 0-0.0007 | 0-0.0003 | 0-0.0008 | 0-0.0004 |
| PQI #90 Prevention Quality Overall Composite | AREA | 2582 | 0-38317 | 1042-7496371 | 0-0.0451 | 0.0045-0.0278 | 0-0.0399 | 0-0.0397 |
| PQI #91 Prevention Quality Acute Composite | AREA | 2582 | 0-14156 | 1042-7496371 | 0-0.0175 | 0.0017-0.0109 | 0-0.0172 | 0-0.0162 |
| PQI #92 Prevention Quality Chronic Composite | AREA | 2582 | 0-24163 | 1042-7496371 | 0-0.0325 | 0.0028-0.017 | 0-0.0288 | 0-0.0285 |
| PQI #93 Prevention Quality Diabetes Composite | AREA | 2582 | 0-5126 | 1042-7496371 | 0-0.0049 | 0.0013-0.0026 | 0-0. 0049 | 0-0. 0049 |
| PSI #2 Death Rate in Low-Mortality Diagnosis Related Groups (DRGs) | PROVIDER | 376 | 0-9 | 1-15172 | 0-0.5 | 0-0.019 | 0-0.0082 | 0-0.0012 |
| PSI #3 Pressure Ulcer Rate | PROVIDER | 383 | 0-51 | 1-27422 | 0-0.0312 | 0-0.0024 | 0-0.0076 | 0-0.0046 |
| PSI #4 Death Rate among Surgical Inpatients with | PROVIDER | 305 | 0-85 | 1-524 | 0-1 | 0.0126-0.3133 | 0-2.2597 | 0.0763-0.169 |
| PSI #4A Stratum A | PROVIDER | 260 | 0-9 | 1-113 | 0-1 | 0.0095-0.2565 | 0-0.6899 | 0.0399-0.0659 |
| PSI #4B Stratum B | PROVIDER | 294 | 0-20 | 1-227 | 0-1 | 0.0126-0.1943 | 0-0.4025 | 0.043-0.0999 |

**Table B.3 AHRQ QI SAS software Version 6.0, Detailed Provider/County Level**

| QI | Type | SAS Version 6.0 | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | Nbr of Provider or Counties | Range Num | Range Den | Range ObsRate (Ratio[†]) | Range ExpRate (Variance[†]) | Range RiskAdjRate (Standard Error[†]) | Range SmoothRate (Weight) |
| PSI #4C Stratum C | PROVIDER | 273 | 0-23 | 1-105 | 0-1 | 0.08-0.4783 | 0-0.7337 | 0.1145-0.2791 |
| PSI #4D Stratum D | PROVIDER | 256 | 0-34 | 1-75 | 0-1 | 0.1174-0.6167 | 0-0.8977 | 0.2355-0.5089 |
| PSI #4E Stratum E | PROVIDER | 260 | 0-10 | 1-98 | 0-1 | 0.0026-0.2526 | 0-0.3172 | 0.0359-0.0555 |
| PSI #5 Retained Surgical Item or Unretrieved Device Fragment Count | PROVIDER | 62 | 1-4 | 1-4 | 1-1 | | | |
| PSI #6 Iatrogenic Pneumothorax Rate | PROVIDER | 395 | 0-22 | 1-41307 | 0-0.0122 | 0-0.0022 | 0-0.0057 | 0.0001-0.0007 |
| PSI #7 Central Venous Catheter-Related Blood Stream Infection Rate | PROVIDER | 394 | 0-17 | 1-29965 | 0-0.0651 | 0-0.0022 | 0-0.0227 | 0-0.0016 |
| PSI #8 Postoperative Hip Fracture Rate | PROVIDER | 394 | 0-9 | 1-30846 | 0-0.0062 | 0-0.0008 | 0-0.0074 | 0-0.0005 |
| PSI #9 Perioperative Hemorrhage or Hematoma Rate | PROVIDER | 331 | 0-125 | 1-14586 | 0-0.0625 | 0.0007-0.0215 | 0-0.0781 | 0.0013-0.0087 |
| PSI #10 Postoperative Physiologic and Metabolic Derangement Rate | PROVIDER | 273 | 0-17 | 1-6138 | 0-0.0769 | 0.0001-0.0315 | 0-0.0566 | 0.0002-0.0022 |
| PSI #11 Postoperative Respiratory Failure Rate | PROVIDER | 269 | 0-77 | 1-5132 | 0-0.25 | 0.0021-0.1923 | 0-0.1089 | 0.0008-0.0241 |
| PSI #12 Perioperative Pulmonary Embolism or Deep Vein Thrombosis Rate | PROVIDER | 331 | 0-109 | 1-15807 | 0-0.125 | 0.001-0.0609 | 0-0.0805 | 0.0006-0.0091 |
| PSI #13 Postoperative Sepsis Rate | PROVIDER | 271 | 0-52 | 1-5948 | 0-0.5 | 0.0008-0.2217 | 0-0.1164 | 0.0011-0.0109 |
| PSI #14 Postoperative Wound Dehiscence Rate | PROVIDER | 291 | 0-8 | 1-1956 | 0-1 | 0.0003-0.0075 | 0-0.0219 | 0.0009-0.0046 |
| PSI #15 Accidental Puncture or Laceration Rate | PROVIDER | 301 | 0-9 | 1-2549 | 0-0.0098 | 0.0003-0.0044 | 0-0.0082 | 0.0003-0.0024 |
| PSI #16 Transfusion Reaction Count | PROVIDER | 4 | 1-5 | 1-5 | 1-1 | | | |
| PSI #18 Obstetric Trauma Rate – Vaginal Delivery With Instrument | PROVIDER | 167 | 0-45 | 1-415 | 0-0.5 | | | |
| PSI #19 Obstetric Trauma Rate – Vaginal Delivery Without Instrument | PROVIDER | 175 | 0-155 | 1-7743 | 0-0.067 | | | |
| PSI #21 Retained Surgical Item or Unretrieved Device Fragment Rate | AREA | 2582 | 0-22 | 1042-7496371 | 0-0.0001 | | | |
| PSI #22 Iatrogenic Pneumothorax Rate | AREA | 2582 | 0-90 | 1042-7496371 | 0-0.0004 | | | |
| PSI #23 Central Venous Catheter-Related Blood Stream Infection Rate | AREA | 2582 | 0-155 | 1042-7496371 | 0-0.0004 | | | |
| PSI #24 Postoperative Wound Dehiscence Rate | AREA | 2582 | 0-33 | 1042-7496371 | 0-0.0002 | | | |

**Table B.3 AHRQ QI SAS software Version 6.0, Detailed Provider/County Level**

| QI | Type | SAS Version 6.0 | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | Nbr of Provider or Counties | Range Num | Range Den | Range ObsRate (Ratio[†]) | Range ExpRate (Variance[†]) | Range RiskAdjRate (Standard Error[†]) | Range SmoothRate (Weight) |
| PSI #25 Accidental Puncture or Laceration Rate | AREA | 2582 | 0-10 | 1042-7496371 | 0-0.0001 | | | |
| PSI #26 Transfusion Reaction Rate | AREA | 2582 | 0-2 | 1042-7496371 | 0-0 | | | |
| PSI #27 Perioperative Hemorrhage or Hematoma Rate | AREA | 2582 | 0-557 | 1042-7496371 | 0-0.0007 | | | |

SOURCE: Agency for Healthcare Research and Quality, AHRQ Healthcare Cost and Utilization Project (HCUP) data: 3,571,315 discharges in the Florida 2013 and Maryland and Nevada 2012 HCUP State Inpatient Databases (SID) (unweighted) and AHRQ Quality Indicator SAS and WinQI ICD-9-CM Version 6.0 Software.

NOTE: Only observed and adjusted ratios are reported for area-level indicators and composites

## Table B.4 AHRQ WinQI software Version 6.0, Detailed Provider/County Level

| QI | Type | WinQI Version 6.0 | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | Nbr of Provider / Facilities or Counties | Range Num | Range Den | Range ObsRate (Ratio[†]) | Range ExpRate (Variance[†]) | Range RiskAdjRate (Standard Error[†]) | Range SmoothRate (Weight[†]) |
| Prevention Quality Indicators (PQIs) | | | | | | | | |
| PQI #1 Diabetes Short-Term Complications Admission Rate | AREA | 2582 | 0-1095 | 1042-7496371 | 0-0.0015 | 0.0005-0.001 | 0-0.0015 | 0-0.0014 |
| PQI #2 Perforated Appendix Admission Rate | AREA | 502 | 0-473 | 1-2018 | 0-1 | 0.1793-0.57 | 0-1 | 0.2091-0.4772 |
| PQI #3 Diabetes Long-Term Complications Admission Rate | AREA | 2582 | 0-3074 | 1042-7496371 | 0-0.003 | 0.0002-0.0016 | 0-0.003 | 0-0.003 |
| PQI #5 Chronic Obstructive Pulmonary Disease (COPD) or Asthma in Older Adults Admission Rate | AREA | 2502 | 0-7815 | 493-4560813 | 0-0.0257 | 0.0031-0.0073 | 0-0.0238 | 0-0.0235 |
| PQI #7 Hypertension Admission Rate | AREA | 2582 | 0-2223 | 1042-7496371 | 0-0.0021 | 0.0001-0.0008 | 0-0.0024 | 0-0.0018 |
| PQI #8 Heart Failure Admission Rate | AREA | 2582 | 0-8666 | 1042-7496371 | 0-0.0082 | 0.0006-0.0072 | 0-0.0087 | 0-0.0087 |
| PQ #10 Dehydration Admission Rate | AREA | 2582 | 0-2510 | 1042-7496371 | 0-0.003 | 0.0004-0.0027 | 0-0.003 | 0-0.003 |
| PQI #11 Bacterial Pneumonia Admission Rate | AREA | 2582 | 0-5410 | 1042-7496371 | 0-0.0104 | 0.0006-0.0052 | 0-0.0103 | 0-0.0094 |
| PQI #12 Urinary Tract Infection Admission Rate | AREA | 2582 | 0-6236 | 1042-7496371 | 0-0.0053 | 0.0006-0.003 | 0-0.0051 | 0-0.0047 |
| PQI #14 Uncontrolled Diabetes Admission Rate | AREA | 2582 | 0-736 | 1042-7496371 | 0-0.0006 | 0.0001-0.0002 | 0-0.0006 | 0-0.0005 |
| PQI #15 Asthma in Younger Adults Admission Rate | AREA | 1663 | 0-370 | 609-2935558 | 0-0.0015 | 0.0003-0.0005 | 0-0.0016 | 0-0.0014 |
| PQI #16 Lower-Extremity Amputation among Patients with Diabetes Rate | AREA | 2582 | 0-424 | 1042-7496371 | 0-0.0007 | 0-0.0003 | 0-0.0008 | 0-0.0004 |
| PQI #90 Prevention Quality Overall Composite | AREA | 2582 | 0-38317 | 1042-7496371 | 0-0.0451 | 0.0045-0.0278 | 0-0.0399 | 0-0.0397 |
| PQI #91 Prevention Quality Acute Composite | AREA | 2582 | 0-14156 | 1042-7496371 | 0-0.0175 | 0.0017-0.0109 | 0-0.0173 | 0-0.0162 |
| PQI #92 Prevention Quality Chronic Composite | AREA | 2582 | 0-24163 | 1042-7496371 | 0-0.0325 | 0.0028-0.017 | 0-0.0288 | 0-0.0285 |
| PQI#93 Prevention Diabetes Composite | AREA | 2582 | 0-5126 | 1042-7496371 | 0-0.0047 | 0.0013-0.026 | 0-0.0049 | 0-0.0049 |
| Patient Safety Indicators(PSIs) | | | | | | | | |
| PSI #2 Death Rate in Low-Mortality Diagnosis Related Groups (DRGs) | PROVIDER | 376 | 0-9 | 1-15172 | 0-0.5 | 0-0.0394 | 0-0.0358 | 0-0.0012 |
| PSI #3 Pressure Ulcer Rate | PROVIDER | 383 | 0-51 | 1-27422 | 0-0.0312 | 0-0.0052 | 0-0.0076 | 0-0.0046 |
| PSI #4 Death Rate among Surgical Inpatients with Serious Treatable | PROVIDER | 305 | 0.0-5.0 | 1-524 | 0-1 | 0.0086-0.5274 | 0-1 | 0.0763-0.169 |
| PSI #4A Stratum A | PROVIDER | 260 | 0.0-48.0 | 1-113 | 0-1 | 0.0038-0.458 | 0-1 | 0.0399-0.0659 |
| PSI #4B Stratum B | PROVIDER | 294 | 0.0-90.0 | 1-227 | 0-1 | 0.0086-0.2032 | 0-0.9099 | 0.043-0.0999 |

**Table B.4 AHRQ WinQI software Version 6.0, Detailed Provider/County Level**

| QI | Type | Nbr of Provider / Facilities or Counties | Range Num | Range Den | Range ObsRate (Ratio[†]) | Range ExpRate (Variance[†]) | Range RiskAdjRate (Standard Error[†]) | Range SmoothRate (Weight) |
|---|---|---|---|---|---|---|---|---|
| | | | | | **WinQI Version 6.0** | | | |
| PSI #4C Stratum C | PROVIDER | 273 | 0.0-9.0 | 1-105 | 0-1 | 0.0085-0.6272 | 0-1 | 0.1145-0.2791 |
| PSI #4D Stratum D | PROVIDER | 256 | 0.0-21.0 | 1-75 | 0-1 | 0.0818-0.7903 | 0-1 | 0.2355-0.5089 |
| PSI #4E Stratum E | PROVIDER | 260 | 0.0-26.0 | 1-98 | 0-1 | 0.0006-0.2526 | 0-0.5574 | 0.0359-0.0555 |
| PSI #5 Retained Surgical Item or Unretrieved Device Fragment Count | PROVIDER | 62 | 0.0-34.0 | | | | | |
| PSI #6 Iatrogenic Pneumothorax Rate | PROVIDER | 395 | 0.0-11.0 | 1-41307 | 0-0.0122 | 0-0.0022 | 0-0.0057 | 0.0001-0.0007 |
| PSI #7 Central Venous Catheter-Related Blood Stream Infection Rate | PROVIDER | 394 | 1.0-4.0 | 1-29965 | 0-0.0651 | 0-0.0022 | 0-0.0233 | 0-0.0016 |
| PSI #8 Postoperative Hip Fracture Rate | PROVIDER | 394 | 0.0-22.0 | 1-30846 | 0-0.0062 | 0-0.0008 | 0-0.0074 | 0-0.0005 |
| PSI #9 Perioperative Hemorrhage or Hematoma Rate | PROVIDER | 331 | 0.0-17.0 | 1-14586 | 0-0.0625 | 0.0007-0.0215 | 0-0.0781 | 0.0013-0.0087 |
| PSI #10 Postoperative Physiologic and Metabolic Derangement Rate | PROVIDER | 273 | 0.0-2.0 | 1-6138 | 0-0.0769 | 0.0001-0.0315 | 0-0.0566 | 0.0002-0.0022 |
| PSI #11 Postoperative Respiratory Failure Rate | PROVIDER | 269 | 0.0-143.0 | 1-5132 | 0-0.25 | 0.0012-0.352 | 0-0.1089 | 0.0008-0.0241 |
| PSI #12 Perioperative Pulmonary Embolism or Deep Vein Thrombosis Rate | PROVIDER | 331 | 0.0-22.0 | 1-15807 | 0-0.125 | 0.001-0.0609 | 0-0.0805 | 0.0006-0.0091 |
| PSI #13 Postoperative Sepsis Rate | PROVIDER | 271 | 0.0-88.0 | 1-5948 | 0-0.5 | 0.0008-0.2217 | 0-0.1164 | 0.0011-0.0109 |
| PSI #14 Postoperative Wound Dehiscence Rate | PROVIDER | 291 | 0.0-141.0 | 1-1956 | 0-1 | 0.0003-0.0165 | 0-0.439 | 0.0009-0.0046 |
| PSI #15 Accidental Puncture or Laceration Rate | PROVIDER | 301 | 0.0-24.0 | 1-2549 | 0-0.0098 | 0.0002-0.0067 | 0-0.0082 | 0.0003-0.0024 |
| PSI #16 Transfusion Reaction Count | PROVIDER | 4 | 0.0-8.0 | | | | | |
| PSI #18 Obstetric Trauma Rate – Vaginal Delivery With Instrument | PROVIDER | 167 | 1.0-5.0 | 1-415 | 0-0.5 | | | |
| PSI #19 Obstetric Trauma Rate – Vaginal Delivery Without Instrument | PROVIDER | 175 | 0.0-80.0 | 1-7743 | 0-0.067 | | | |
| PSI#21 Retained Surgical Item or Unretrieved Device Fragment Rate | AREA | 2582 | 0.0-45.0 | 1042-7496371 | 0-0.0001 | | | |
| PSI #22 Iatrogenic Pneumothorax Rate | AREA | 2582 | 0.0-155.0 | 1042-7496371 | 0-0.0004 | | | |
| PSI #23 Central Venous Catheter-Related Blood Stream Infection Rate | AREA | 2582 | 0.0-22.0 | 1042-7496371 | 0-0.0004 | | | |

**Table B.4 AHRQ WinQI software Version 6.0, Detailed Provider/County Level**

| QI | Type | WinQI Version 6.0 | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | Nbr of Provider / Facilities or Counties | Range Num | Range Den | Range ObsRate (Ratio[†]) | Range ExpRate (Variance[†]) | Range RiskAdjRate (Standard Error[†]) | Range SmoothRate (Weight) |
| PSI #24 Postoperative Wound Dehiscence Rate | AREA | 2582 | 0.0-90.0 | 1042-7496371 | 0-0.0002 | | | |
| PSI #25 Accidental Puncture or Laceration Rate | AREA | 2582 | 0.0-156.0 | 1042-7496371 | 0-0.0001 | | | |
| PSI #26 Transfusion Reaction Rate | AREA | 2582 | 0.0-33.0 | 1042-7496371 | 0-0 | | | |
| PSI #27 Perioperative Hemorrhage or Hematoma Rate | AREA | 2582 | 0.0-418.0 | 1042-7496371 | 0-0.0007 | | | |

SOURCE: Agency for Healthcare Research and Quality, AHRQ Healthcare Cost and Utilization Project (HCUP) data: 3,571,315 discharges in the Florida 2013 and Maryland and Nevada 2012 HCUP State Inpatient Databases (SID) (unweighted) and AHRQ Quality Indicator SAS and WinQI ICD-9-CM Version 6.0 Software.

NOTE: Only observed and adjusted ratios are reported for area-level indicators and composites